

CLAIMS

1. A fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, said stage comprising, a sample stage having at least one axis of translation and means for causing displacement of said stage relative to said probe.
2. A fast scanning stage as claimed in claim 1 in which said means for causing displacement of said sample comprise at least one actuator element supporting said stage and a sine waveform generator for actuating said at least one actuator element.
3. A fast scanning stage as claimed in claim 2 in which said means for causing displacement of said sample comprise four actuator elements supporting said stage.
4. A fast scanning stage as claimed in claim 2 in which said stage is displaced by being driven at the frequency of resonant vibration corresponding to translation of said sample with respect to said probe.
5. A fast scanning stage as claimed in claim 3 in which said stage has a square or rectangular configuration and each corner of said stage is supported by one of said actuator elements.
6. A fast scanning stage as claimed in claim 5 in which said actuator elements form a parallelogram scanning element.
7. A fast scanning stage as claimed in claim 6 in which said actuator elements are connected electrically in parallel.

8. A fast scanning stage as claimed in claim 2 in which said at least one actuator element comprises a stack bending element.
9. A fast-axis scanning stage as claimed in claim 2 in which said at least one actuator element comprises a PZT bimorph.
10. A fast-axis scanning stage as claimed in claim 3 in which said at least one actuator element comprises a PZT bimorph.
11. A fast-axis scanning stage as claimed in claim 1 in which said stage is comprised of a material selected from the group consisting of ceramics, heat resistant polymers, and anodized aluminum.
12. A scanning probe microscope including a probe and a fast scanning stage, said fast scanning stage comprising a sample stage having at least one axis of translation and at least one actuator element supporting said stage to cause displacement of said stage relative to said probe.
13. A method of operating a fast scanning stage for a scanning probe microscope, said scanning probe microscope including a probe, comprising, providing a sample stage having a sample thereon and causing displacement of said stage relative to said probe.
14. A method as claimed in claim 13 in which said displacement is caused by driving said stage at its resonant frequency.
15. A method as claimed in claim 14 in which the resonant frequency of said stage is about $1/100^{\text{th}}$ that of the resonant frequency of said probe.